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RKKY-interaction between Ce-ions in $\text{Ce}_x\text{La}_{1-x}\text{B}_6$

P. Schlottmann

Department of Physics, Florida State University, Tallahassee, Florida 32306

Ce-ions in $(\text{Ce},\text{La})\text{B}_6$ have a Γ_8 ground multiplet, which is four-fold degenerate and has orbital and spin content. The interaction between Ce-ions is of the RKKY-type, which competes with the Kondo screening. The conduction states of the compound are described by three approximately ellipsoidal pockets centered at the X -points of the cubic lattice. The RKKY-interaction is calculated considering the interference of the three pockets. The interaction strength strongly depends on the relative position of the ions, as well as on the relative orientation of the line joining two ions to the cubic crystalline field axis. The sixteen states of a pair of Ce-ions are split by the RKKY interaction into a singlet, a triplet and a twelve-fold degenerate level. The ground state is always either a singlet or a triplet, depending on the sign of the interaction. Using the exact Bethe *Ansatz* solution of a model for a pair of interacting impurities with Γ_8 ground multiplet, we calculate the occupation of the levels, the magnetic field susceptibility, the specific heat γ -coefficient and the Wilson ratio for the ground state as a function of the ratio of the RKKY-coupling strength to the Kondo temperature along the main crystallographic directions. As a consequence of the RKKY-splitting a pair of impurities always has a quadrupolar moment. The implication of the interactions on the quadrupolar order of CeB_6 is also discussed.